QUALITY ASSESSMENT OF PHOSPHORUS FERTILIZERS RECOVERED FROM MUNICIPAL WASTEWATER

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Phosphorus demand in Europe

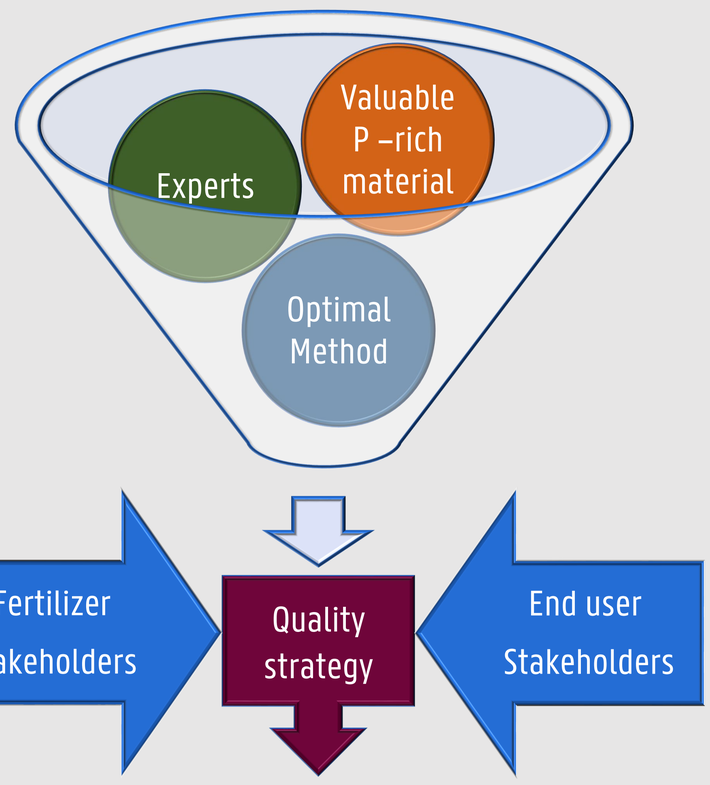
- Phosphorus (P) rock is listed as a critical raw material (European Commission, 2014)
- Europe depends highly on import of mineral phosphorus (more than 90 %)
- P demand is increasing in North-West Europe (NWE): rural, urban and port area
- Around 15 % of the P in Europe is wasted as sewage sludge or ash (Van Dijk, Lesschen & Oenema, 2016)
- Recovery potential of P in municipal sewage water in NWE was estimated to 26%

Quality assessment demand

- There is insufficient investigation of new phosphorus fertilizers plant availability
- Methods for quality assessment of new phosphorus fertilizers require standardization
- Formulation of recycled fertilizers should be improved to achieve better plant uptake
- New fertilizing products need to have proof of safety
- Crop and soil specific response to the new phosphorus fertilizers should be examined

Phos4You project goals

- Resolve the demand for phosphorus within the scope of circular economy practices
- Demonstrate 6 innovative P-recovery technologies
- Process the valuable P from the municipal wastewater in the form of favorable products for fertilizers
- Provide quality and safety assessment ensuring the applicability of the recycled material on the market
- Address social barriers in terms of acceptance and legal aspects



Source material

- Sewage sludge
- Sewage sludge ash
- Wastewater
- Sewage sludge centrate/digestate

New P recycling technology

- Thermal process
- Sludge leaching
- Ash Leaching
- Nature based process
- P adsorption
- P salt precipitation

Fertilizing product

- P slag
- Ca/K/Mg phosphate
- DCP/P acid
- Microalage
- Granules
- MAP/DCP

Quality tests

- **Nutrients**
  - Micronutrients and Macronutrients
  - Total and Bioavailable
- **Contaminants**
  - Heavy metals
  - Organic (emerging) contaminants
  - Pathogens
- **Eco toxicity**
  - Versatile plant species
  - Soil organisms

Product quality assessment within Phos4You project

- Formulation of analytical methodology to define the quality and determine safety of the various products from different processes and locations
- Examination of nutrient availability of new phosphorus fertilizing materials
- Standardization of the methods for unique quality assessment of recycled nutrients within Phos4You consortium
- Support and enhancement of the EU-standard e.g. WG-STRUBIAS

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